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Public Health Reports

Treasury Department, United States Marine-Hospital Service. Published in accordance with act of Congress approved February 15, 1893.

VOL. XV. WASHINGTON, D. C., FEBRUARY 16, 1900. No. 7.

UNITED STATES.

THE RELATIVE IMPORTANCE OF VARIOUS AGENCIES IN THE PROPAGATION OF THE PLAGUE.

In the article on the Bubonic Plague, recently published by the Surgeon-General, Marine-Hospital Service, in the discussion of the various agencies in the propagation of the plague, there were mentioned, the dangers from ambulant cases of the disease, and from rats.

Rats as carriers of plague.

A mass of evidence is being accumulated in this Bureau which goes to show that while the ambulant type of the malady calls for great vigilance, the greatest danger is to be apprehended from the importation of the disease through the instrumentality of the ordinary rat.

There is a strong probability that the rat was responsible for the introduction of the plague into Oporto; there is little doubt that it was introduced into Santos through the same medium; private advices from Honolulu indicate that it was not there introduced through food stuffs or merchandise, but that again the rat was the responsible agent.

The attention of quarantine and health officers is therefore again invited to the vital necessity for rigorous measures for ridding all ships from infected and suspected ports of rats and other vermin at the ports of arrival and the expediency and necessity of measures looking to the elimination of the same at ports of departure prior to the taking on of cargo for the United States.

Rats migrate from ship to ship along docks and quays in search of food, and ships loaded with rice and other food stuffs should therefore be particularly looked after. They should be subjected to fumigation

prior to taking on cargo, and subsequently guarded to prevent as far as possible the invasion by rats.

Although a port or place where plague has prevailed may be pronounced free from the disease, because there have been no cases among persons for a certain period, it does not follow that the port or place is free from danger, for the disease may still be prevailing among rats, and it is quite as important from a quarantine or sanitary standpoint to be assured that the disease has ceased among rats as among persons.

It is gratifying to note the unanimity of sentiment which seems to be growing up among all health authorities on this subject, and the vigorous measures which have been instituted abroad looking to the suppression of the rat as a recognized source of danger.

The flea as an agent of infection.

From time to time articles have appeared in the daily and medical press as to the danger of the spread of the disease through the medium of fleas, which may have infested rats and mice stricken with plague, and which may subsequently invade and bite man. While the danger may be a real one, the risk would seem to be small, as would appear from the following article by Dr. Bruno Galli-Valerio, of Lausanne, which article is here presented translated from the "Centralblatt für Bakteriologie, etc.," for January 6, 1900:

[Translation.]

DO THE FLEAS OF RATS AND MICE PLAY AN IMPORTANT RÔLE IN
THE TRANSMISSION OF BUBONIC PLAGUE TO MAN?

In No. 10 of the Annals of the Pasteur Institute of 1898, there appeared a long article by Dr. Simond on the propagation of the plague, in which article the author lays great stress on the rôle played in the dissemination by rats and their fleas.

Dr. Simond has proved that in a certain number of cases the patients present at the onset of the disease a vesicle, in which is found the bacillus of plague. To him these vesicles seem to be the point of entry of the virus, and that they are produced by the bites of the fleas of rats and mice, but the following is the description which Dr. Simond gives of this particular flea:

The flea which we have seen most frequently upon the house rat (in India) is of medium size, of grayish color with a wine-colored spot upon the lateral surfaces of the abdomen. This spot is nothing else but the stomach, filled with blood, and rendered visible by reason of its transparency. We do not know whether this flea is of a different variety, from that of a reddish-brown color, common to man and to the domestic animals; we have always been able, however, to determine experimentally that carried from the rat to man or to the dog, it attacks them immediately.

By examination of the intestinal contents of this flea taken from plague-stricken rats, Dr. Simond has proved in several instances the

presence of a bacillus morphologically resembling that of plague. He inoculated 3 mice with fleas taken from a plague-stricken rat and triturated with a few drops of water. One only died of demonstrable plague at the end of eighty hours; the others died in nine and twelve days, respectively, without presenting plague bacilli in any of the organs. He succeeded in proving the death of a rat and a mouse which he had placed in a jar along with a rat dead of the plague, and to which he had added fleas taken from a cat, while seven rats placed in a jar with a rat dead of plague but without fleas did not sicken or die.

According to Dr. Simond, these fleas, getting upon a man, will inoculate him with plague, either by means of the blood which adheres to their suctorial proboscis, or, most frequently, by depositing their excrement, loaded with plague bacilli, upon the wounds which they make by their bites.

Such are the facts which Dr. Simond adduces to build up his theory of the transmission of plague to man from rats through the intermediary of fleas. Let us examine his facts: Dr. Simond has been quite incapable of distinguishing the fleas of rats and mice from those of man, as he states above. Truly this is a remarkable assertion on the part of a person who knows the use of a microscope enough to reveal the plague bacilli. The characteristics of the flea of man which has nothing in common with those of the fleas of rats and mice, are so clearly limited that with the lowest magnification one should be able to clearly distinguish between them. The flea of man (*Pulex irritans*) has an ovoid body, reddish brown in color, and is without a comb upon the head or prothorax. The flea which is most commonly met with on rats and mice (*Typhlopsylla musculi*) has a thin body, is yellowish in color, with spines upon each side of the inferior border of the head and a comb upon the prothorax. Upon the mouse and upon the marmot we also find the *Pulex fasciatus*, but it presents upon the prothorax a comb of eighteen points, and has only been found as I remember in Holland and in Halle, and I myself have only found it once in Milan.

Dr. Simond besides appears to believe that the flea of man is the same which infests the bodies of all domestic animals, and wishing, I do not know why, to demonstrate that the fleas of rats and mice are the agents for the transmission of plague, makes use of those of the cat (*Pulex serraticeps*) which has nothing in common with that of the rodents or of man. In such researches, which are of such practical importance, it seems to be absolutely indispensable not to create such deplorable confusion.

That in the fleas of rats and mice we may find the bacillus of plague, I had already announced in 1897, giving plague to mice by inoculating them with infected fleas. That this bacillus may be inoculated into rats and mice by the bites of fleas is very possible. What I consider as not proved is that the fleas of rats and mice may transmit the disease to man.

We know positively that different fleas have hosts which are peculiar to them. Should they sometimes pass to another host they do not there remain long and often do not bite them at all. Dr. Simond tells us that he has proved that the fleas of rats, put upon a dog and upon man, bite them immediately. We can not accept this assertion, for we know of no flea which has given such experimental results as claimed by Dr. Simond. I can affirm, on the contrary, that the *Typhlopsylla musculi*, the most common flea on rats and mice, does *not* bite man.

The following experiments show my observations in this respect: Once, in handling a white mouse which was covered with *T. musculi*, numerous fleas got upon me. They immediately left my body and did not bite me. I have also endeavored to prove that the fleas of rats and mice would bite a man. In the first series of these experiments I have placed *Typhlopsylla musculi* under small watch glasses and fixed them on various parts of my body, and left them in place for twenty-four to forty-eight hours. I did not receive a single bite, and on removing the watch glass the fleas immediately left me.

In another series of experiments I have placed *Typhlopsylla musculi* of the same age as the above freely on my body. They immediately left me. One might believe that I am refractory to the bites of fleas, but this is not the case, for the fleas of man bite me very freely. To sum up, then, the assertions of Dr. Simond are far from being convincing. * * * If the transmission of plague from rats and mice to man through the medium of the fleas of these animals is possible, it is far from being demonstrated. Further, neither the physicians of the German commission to India, or the Italians at Oporto, have found any trace of a similar transmission. It is much more probable that the transmission, if it exists at all, is from man to man through the *Pulex irritans*.

[Reports to the Surgeon-General United States Marine-Hospital Service.]

Dysentery on the schooner R. D. Spear, of Philadelphia.

JACKSONVILLE, FLA., January 31, 1900.

SIR: I beg to invite your attention to my report of out-patients relative to 6 cases of dysentery. Five of these cases were from 1 vessel, the schooner *R. D. Spear*, of Philadelphia. The captain and entire crew have suffered with dysentery from the second day out from Philadelphia. After thorough examination of these men, I attribute the malady to water used for drinking purposes, which the captain tells me is derived from the river at Philadelphia. The discharges were not examined.

Respectfully,

R. H. MCGINNIS,

Acting Assistant Surgeon, U. S. M. H. S.

Smallpox in Brunswick, Ga.

BRUNSWICK, GA., February 5, 1900.

SIR: I have the honor to announce since my last report the existence of 46 cases of smallpox sent to the pesthouse from various localities in the city, all colored, except 3 or 4 whites. The municipal authorities are enforcing compulsory vaccination among the colored population.